

### **Amendments to the Claims**

This listing of claims will replace the originally filed claims in the application.

#### **Listing of Claims:**

Claims 1 – 16 (cancelled)

Claim 17 (currently amended): ~~The method of claim 12, A method which may be used for simultaneously producing hydrogen and carbon monoxide, said method comprising:~~

- a) receiving a synthesis gas from a synthesis gas production unit, wherein said synthesis gas comprises hydrogen and carbon monoxide;
- b) decarbonating said synthesis gas in a decarbonation unit;
- c) desiccating said synthesis gas in a desiccation unit;
- d) cryogenically separating said desiccated synthesis gas in a cryogenic separation unit; and
- e) recycling a gas, containing at least about 60% hydrogen, upstream of said decarbonation unit and downstream of said synthesis gas production unit, wherein said gas to be recycled comprises at least one member selected from the group consisting of:
  - 1) a gas from said cryogenic separation; and
  - 2) a portion of a gas upstream of said cryogenic separation unit;

further comprising regenerating said desiccation unit with said gas containing at least about 60% hydrogen prior to sending said gas containing at least about 60% hydrogen upstream of said decarbonation unit.

Claim 18 (currently amended): ~~The method of claim 12, A method which may be used for simultaneously producing hydrogen and carbon monoxide, said method comprising:~~

- a) receiving a synthesis gas from a synthesis gas production unit, wherein said synthesis gas comprises hydrogen and carbon monoxide;
- b) decarbonating said synthesis gas in a decarbonation unit;
- c) desiccating said synthesis gas in a desiccation unit;
- d) cryogenically separating said desiccated synthesis gas in a cryogenic separation unit; and
- e) recycling a gas, containing at least about 60% hydrogen, upstream of said decarbonation unit and downstream of said synthesis gas production unit, wherein said gas to be recycled comprises at least one member selected from the group consisting of:
  - 1) a gas from said cryogenic separation; and
  - 2) a portion of a gas upstream of said cryogenic separation unit;

further comprising compressing said decarbonated synthesis gas in a compressor prior to sending said decarbonated synthesis gas to said desiccation unit.

Claim 19 (previously presented): The method of claim 17, further comprising sending a second gas to a location upstream of said compressor and downstream of said decarbonation unit, wherein said second gas is enriched with hydrogen from said cryogenic separation.

Claims 20 - 21 (cancelled)

Claim 22 (currently amended): ~~The apparatus of claim 20,~~ An apparatus which may be used for substantially simultaneously producing hydrogen and carbon monoxide, said apparatus comprising

- a) a means for receiving a synthesis gas from a synthesis gas production unit;
- b) a decarbonation unit;
- c) a desiccation unit;

- d) a cryogenic separation unit;
- e) a means for connecting said synthesis gas production unit with said decarbonation unit;
- f) a means for connecting said decarbonation unit with said desiccation unit;
- g) a means for connecting said desiccation unit with said cryogenic separation unit; and
- h) a means for withdrawing hydrogen and carbon monoxide as products, wherein said withdrawing means comprises a means for recycling a gas containing at least about 60% hydrogen, wherein said gas to be recycled comprises at least one member selected from the group consisting of:
  - 1) a gas from said cryogenic separation; and
  - 2) a portion of a gas upstream of said cryogenic separation unit;

wherein said products are withdrawn upstream of said decarbonation unit and down stream of said synthesis gas production unit.

Claim 23 (currently amended): ~~The apparatus of claim 20,~~ An apparatus which may be used for substantially simultaneously producing hydrogen and carbon monoxide, said apparatus comprising

- a) a means for receiving a synthesis gas from a synthesis gas production unit;
- b) a decarbonation unit;
- c) a desiccation unit;
- d) a cryogenic separation unit;
- e) a means for connecting said synthesis gas production unit with said decarbonation unit;
- f) a means for connecting said decarbonation unit with said desiccation unit;
- g) a means for connecting said desiccation unit with said cryogenic separation unit; and

h) a means for withdrawing hydrogen and carbon monoxide as products, wherein said withdrawing means comprises a means for recycling a gas containing at least about 60% hydrogen, wherein said gas to be recycled comprises at least one member selected from the group consisting of:

- 1) a gas from said cryogenic separation; and
- 2) a portion of a gas upstream of said cryogenic separation unit;

further comprising a compression means located downstream of said decarbonation means.

Claim 24 (currently amended): ~~The apparatus of claim 20,~~ An apparatus which may be used for substantially simultaneously producing hydrogen and carbon monoxide, said apparatus comprising

a) a means for receiving a synthesis gas from a synthesis gas production unit;

b) a decarbonation unit;

c) a desiccation unit;

d) a cryogenic separation unit;

e) a means for connecting said synthesis gas production unit with said decarbonation unit;

f) a means for connecting said decarbonation unit with said desiccation unit;

g) a means for connecting said desiccation unit with said cryogenic separation unit; and

h) a means for withdrawing hydrogen and carbon monoxide as products, wherein said withdrawing means comprises a means for recycling a gas containing at least about 60% hydrogen, wherein said gas to be recycled comprises at least one member selected from the group consisting of:

- 1) a gas from said cryogenic separation; and
- 2) a portion of a gas upstream of said cryogenic separation unit;

further comprising a means for sending said hydrogen enriched gas to said desiccation unit.

Claim 25 (currently amended): ~~The apparatus of claim 20;~~ An apparatus which may be used for substantially simultaneously producing hydrogen and carbon monoxide, said apparatus comprising

- a) a means for receiving a synthesis gas from a synthesis gas production unit;
- b) a decarbonation unit;
- c) a desiccation unit;
- d) a cryogenic separation unit;
- e) a means for connecting said synthesis gas production unit with said decarbonation unit;
- f) a means for connecting said decarbonation unit with said desiccation unit;
- g) a means for connecting said desiccation unit with said cryogenic separation unit; and
- h) a means for withdrawing hydrogen and carbon monoxide as products, wherein said withdrawing means comprises a means for recycling a gas containing at least about 60% hydrogen, wherein said gas to be recycled comprises at least one member selected from the group consisting of:
  - 1) a gas from said cryogenic separation; and
  - 2) a portion of a gas upstream of said cryogenic separation unit;

wherein said cryogenic separation unit comprises:

- a) a methane scrubbing column;
- b) a stripping column;
- c) a rectifying column; and
- d) a means for withdrawing said hydrogen enriched gas from said methane scrubbing column.

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Claim 26 (previously presented): The apparatus of claim 25, further comprising a means for sending a hydrogen enriched gas from the stripping column to a location downstream of said decarbonation unit.